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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/633,756	08/07/2000	Sharon Duvdevani	U 012894-7	3691

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09/29/2003

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EXAMINER

KIBLER, VIRGINIA M

ART UNIT

PAPER NUMBER

2623

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/633,756

Applicant(s)

DUVDEVANI ET AL.

Examiner

Virginia M Kibler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 9-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 August 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4-6.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 7.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-8, drawn to image processing for inspecting objects by pattern boundary measurements, classified in Class 382, Subclass 199.
 - II. Claims 9-10, drawn to image processing for defect detection using learning systems, classified in Class 382, Subclass 155.
 - III. Claims 11-18, drawn to image processing for inspecting objects using shape and form analysis, classified in Class 382, Subclass 203.
 - IV. Claim 19, drawn to image processing using general purpose image processors, classified in Class 382, Subclass 307.
 - V. Claims 20-28, drawn to image processing for manufacturing or product inspection, classified in Class 382, Subclass 141.
 - VI. Claims 29-33, drawn to image processing for inspecting printed circuit boards, classified in Class 382, Subclass 147.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions are related as subcombinations disclosed as usable together in single combination. The subcombinations are distinct from each other if they are shown to be separately usable. See MPEP § 806.05(d).
3. In the instant case, invention I has separate utility such as for inspecting objects by pattern boundary measurements.

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Invention II has separate utility such as defect detection using learning systems.

Invention III has separate utility such as inspection objects using shape and form analysis.

Invention IV has separate utility such as image processing using general purpose image processors for use in a scanner.

Invention V has separate utility such as manufacturing or product inspection.

Invention VI has separate utility such as inspecting PCBs.

4. During a telephone conversation with Julian Cohen on 9/15/03 a provisional election was made without traverse to prosecute the invention of group I, claims 1-8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-33 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Jacques (FR 2687091).

Regarding claim 1, Jacques discloses a method for inspecting objects including creating a reference image for a representative object, the reference image comprising an at least partially

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vectorized first representation of boundaries within the image, acquiring an image of an object under inspection comprising a second representation of boundaries within the image, and comparing the second representation of boundaries to the partially vectorized first representation of boundaries, thereby to identify defects (Abstract).

Regarding claim 2, Jacques discloses a comparing step employing a user-selected variable threshold for acceptable distance between corresponding portions of the boundaries in the first and second representations (Page 27, lines 24-35).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacques (FR 2687091) in view of Aloni et al. (5,619,429).

Regarding claim 3, Jacques discloses inspecting objects including creating a reference image for a representative object, the reference image comprising an at least partially vectorized first representation of boundaries within the image, thereby a boundary identifier, acquiring an image of an object under inspection comprising a second representation of boundaries within the image, and comparing the second representation of boundaries to the partially vectorized first representation of boundaries, thereby to identify hardware defects (Abstract). While Jacques does not appear to specify the hardware defect candidate is implemented in hardware, the

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implementation of the method as a hardware device is well known to electronic engineers skilled in the art of designing modern digital signal processing boards. Jacques does not appear to recognize including a software candidate defect inspector to identify false alarms in software. However, Aloni et al. ("Aloni") teaches that it is known to provide a hardware candidate defect identifier to identify candidate defects in the image in hardware (Figure 2, components 32 and 64; Col. 14, lines 4-41; Col. 26, line 67, Col. 27, line 1) and a software candidate defect inspector receiving output from the hardware candidate defect identifier to identify at least one false alarm with the output in software (Col. 14, lines 53-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the defect inspection disclosed by Jacques to include a inspector for false alarms as taught by Aloni because it verifies the actual defects and improves reliability of defect recognition system.

Regarding claim 4, Jacques discloses the boundary identifier comprising a boundary identifier operative to generate a representation of boundaries of known elements in the image. Jacques does not appear to expressly state a hardware boundary identifier in hardware. While Jacques does not appear to specify the hardware boundary identifier implemented in hardware, the implementation of the method as a hardware device is well known to electronic engineers skilled in the art of designing modern digital signal processing boards as taught by Aloni (Figure 2, components 32 and 64; Col. 14, lines 4-41; Col. 26, line 67, Col. 27, line 1).

Regarding claim 7, Jacques discloses the hardware defect identifier employs the representation of boundaries in order to identify the defects (Abstract).

Regarding claim 5, Jacques does not appear to recognize using a software candidate defect identifier in software. However, Aloni teaches that it is well known to perform defect

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detection with hardware and software techniques (Col. 14, lines 53-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the defect detection disclosed by Jacques to include using both hardware and software detection as taught by Aloni because when used in conjunction proficiency of defect recognition will be increased.

Regarding claim 6, Aloni discloses a software candidate defect inspector receiving output from the hardware candidate defect identifier to identify at least one false alarm with the output in software and software candidate defect identifier (Col. 14, lines 42-65; Col. 26, lines 66-67, Col. 27, lines 1-5).

Regarding claim 8, the arguments analogous to those presented above for claim 7 are applicable to claim 8.

Other Prior Arts Cited

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Baxes, *Digital Image Processing Principles and Applications*, John Wiley & Sons, 1994, pages 160-178;

Sohn et al., "Boundary Representation with Lines and Circular Arcs Using Boundary Split-and-Merge Method," IEEE 1991, pages 707-711;

U.S. Pat. No. 6,036,091 to Spitz for method and apparatus supporting high speed evaluation of bar code indicia;

U.S. Pat. No. 6,577,757 to DeYong et al. for dynamic image recognition;

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U.S. Pat. No. 6,028,948 to Kil et al. for surface anomaly-detection and analysis method;
and

U.S. Pat. No. 6,366,690 to Smilansky et al. for pixel based machine for patterned wafers.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon-Thurs 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.



VK

9/20/03

MEHRDAD DASTOURI
PRIMARY EXAMINER

AU 2623

Mehrdad Dastouri